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COMPLETE SPECIFICATION

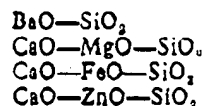
Glasses for the Manufacture of Superfine Fibres

WE, ACTIEN-GESELLSCHAFT DER GERRES-
HEIMER GLASHÜTTENWERKE VORM. FRD.
HEYB, a German Company, of Düsseldorf-
Gerresheim, Germany, do hereby declare the
invention, for which we pray that a patent
may be granted to us, and the method by
which it is to be performed, to be particularly
described in and by the following state-
ment:—

Mineral fibres of great or infinite length
with a diameter of more than 5μ , can be
manufactured according to the known Owens
blowing process by allowing the blowing jet
to act at high velocity on the streams of the
molten mass coming from the nozzles of the
container for the molten material in the direc-
tion of their flow, and drawing the streams
to a smaller diameter. On the other hand very
fine fibres, namely with a diameter of less than
 5μ , have been produced according to the
known mineral wool blowing process (slag
wool, rock wool). This cannot be achieved by
the action of drawing alone. Rather it is
necessary when blowing for there to be a tear-
ing and dividing up of the streams of material.
The resulting fine fibres are short and have
an appearance similar to wadding. One diffi-
culty, however, is that the product contains a
large proportion of coarse drops, which may
reach up to 50% by weight.

By improving the blowing technique of this
process attempts have been made to improve
the quality of these fine mineral wools and
particularly to reduce the proportion of coarse
drops without, however, any satisfactory
result having been achieved.

It has now been found that it is possible to
produce a very fine fibre with a diameter be-
low 5μ by the known blowing or centrifugal
process of disintegrating the stream of molten
material and to avoid the occurrence of coarse
drops, by using, for the manufacture of these
fibres, glasses of silica binary or ternary sys-
tems which contain practically no alumina,
e.g. glasses of the following systems:



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The melts of such systems are very similar
to salt melts. Their principal characteristic is
high surface tension in conjunction with very
low viscosity which is maintained almost
directly until devitrification, when it then
increases rapidly. Owing to these properties,
the melt, on being blown is first reduced to
a multiplicity of very small drops (like
mercury) which are then drawn out into very
fine fibres. The drops still contained in the
wool are so small that they can scarcely be
perceived with the naked eye. The melts of
the binary and ternary systems also have the
advantage in the blowing process that they
lead to higher capacity because, in conse-
quence of its lower viscosity, the melt flows
out more easily and rapidly through the
nozzles of the container for the molten
material.

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Mineral fibres known up to now all contain
considerable quantities of alumina, or they
contain in addition to the usual constituents
other common additions which cause the
viscosity to rise steadily over a fairly long
range, for example a range of 500°, up to the
setting point. The generally lower surface
tension of these melts cannot remain effective
sufficiently long, owing to the more rapid rise
in the viscosity, so that only a coarse disin-
tegration of the melt is achieved.

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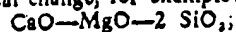
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Previously it has not been thought possible
to dispense with the use of alumina in the
manufacture of mineral fibres in order to ob-
tain strong, i.e. weather-resistant, fibres. It has
now been shown, however, that at least equal,
if not better, chemical and physical properties
of the end product can be achieved if the
composition of the melt is so selected as to ob-
tain a congruent melting chemical compound
which at the same time does not suffer from
any chemical change, for example:

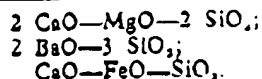
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(Melting is "congruent" when the chemical composition of the solid phase is identical with the composition of the liquid phase throughout melting.)

Mineral wools of such chemical compounds show, in consequence of their stronger molecular bond, a considerably better chemical resistance than wools of simple silicate mixtures so that one can omit the usual addition of alumina.

Polymorphous compounds should be avoided because when higher temperatures act on the mineral wools disintegration may occur by crystal conversion, a process which has frequently been observed in mineral wools known up to now.

What we claim is:—

1. Glasses, for the manufacture of very fine mineral fibres by disintegration of the melt in blowing or centrifugal processes, consisting of chemical compounds of silica binary or silica

ternary systems, substantially free from alumina, which melt congruently and are unchanged in conversion from the solid to the liquid phase.

2. Glasses according to claim 1 wherein the system is CaO—SiO_2 .

3. Glasses according to claim 1 wherein the system is BaO—SiO_2 .

4. Glasses according to claim 1 wherein the system is CaO—MgO—SiO_2 .

5. Glasses according to claim 1 wherein the system is CaO—FeO—SiO_2 .

6. Glasses according to claim 1 wherein the system is CaO—ZnO—SiO_2 .

7. A process for the manufacture of very fine mineral fibres, wherein a melt of a glass according to any one of the preceding claims is blown and first reduced to very small drops which are then drawn out to form the very fine fibres.

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